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Teaching the Unteachable: Helping Students Make Sense of the Web

Deborah Wills
Wilfrid Laurier University, dwills@wlu.ca

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A few years ago, when the Web was relatively unknown, the literature abounded with articles on the importance of teaching students to use this new medium. For example, Fishel and Stevens (1994) stressed the need to show students the value of the Web and to make them comfortable using it. However, the world is different now; most students are regular Web users and may seem more familiar than their instructors with Web resources. Moreover, the Web resists being taught; it is advertised relentlessly as a friendly, "type it and go" environment, tailor-made for the end user. In addition, surveys of students show they are very confident in their ability to use the Web (McFadden 2001, 88). As a result, students may resist formal training, convinced that this is "their" environment and that the average, middle-aged instructor has little to tell them. Instructors in turn may feel overwhelmed and reluctant to appear at a disadvantage.

While it may seem unnecessary to teach the Web in the classroom, in fact, many faculty and librarians report that students are unaware of the Web's limitations, fail to use it efficiently and struggle to evaluate the resources they find (Herring 2001). With the increasing use of the Web, it is more important than ever to help students make sense of this medium.

Teaching the Web may appear a daunting task; however, a few well-chosen guidelines and starting points can be invaluable for students. Whether or not instructors possess in-depth knowledge of the Web, they can use their existing

knowledge of their discipline and of key information resources to guide their students.

Where to Begin?

A central issue, for both students and instructors, is how to define the Web: what resources does it include? Does the "Web" refer only to resources that are freely available and accessible using a search engine? Or does it also include those Web-based materials purchased by the library? Studies suggest that students do not draw distinctions between different kinds of online resources. For example, D'Esposito and Gardner (1999) found that undergraduates had difficulty distinguishing between the proprietary resources provided by the library and freely-available information (460). For the purposes of this paper, the Web is defined to include all online materials, free and proprietary, that are accessed using a Web browser. The focus will be on helping students identify and use the resources most appropriate for their assignments.

Some of the confusion about the Web stems from the ease with which it links to all types of information. Before the Web, different tools had different physical locations: the library catalogue was in card format or on specialized computers; indexes, for finding journal articles, were in paper format or on dedicated CD-ROM workstations. The task of finding and recognizing the best resources was never easy, but at least the major tools could be clearly differentiated.

Now, with the Web, the information process is at once more simple and more complex: a single workstation provides access to library catalogues (which include

direct links to Web-based resources), journal indexes, full-text journals, and countless Web sites. How can we help students make sense of all this?

Each time I teach a class about information resources, I first ask the students where and how they search for information. Our library has also prepared written questionnaires to discover how students do research. The results are consistent: almost all students begin the process with their favorite Web search engine, usually Google. In addition, many students believe that search engines will lead them to all the information on the Web. These findings were recently confirmed by Tillotson (2002) in surveys of undergraduates at the Memorial University of Newfoundland and McGill University in Montreal.

The magnitude of the Web and the power of search engines have both positive and negative effects on the information-finding process. Google, in particular, does a remarkable job of retrieving useful resources, even including a growing number of full-text journal articles which authors or publishers have made freely available. However, much quality information remains hidden to Google, so students must look elsewhere for many of the best resources. The problem becomes: how to convince them to move beyond Google.

Beyond Google

While our students will never abandon Google entirely (and I let them know I use it myself every day) they need a variety of techniques for finding information. To begin, they need some specific, compelling reasons to try other tools.

Students must first learn about the types of resources that are essential for their

research–most notably, scholarly journal articles and monographs. They also need to understand the peer review process and be able to identify important journals for their field of study. Once students appreciate the centrality of scholarly materials, they can be shown the limits of search engines for finding this information. Most importantly, they need to understand that search engines cannot access the contents of proprietary databases that provide citations to scholarly materials and a growing amount of full-text information. They may not realize just how much is hidden from search engines: it has been estimated that even for publicly-available information, the "invisible" or "deep" Web may be as much as 500 times larger than the commonly defined Web accessible by traditional search tools (Bergman 2000, 4).

Also, since more and more full-text journals are becoming available online, students may not realize that many important journals are still available only in print. Here, we must battle against both the students' lack of knowledge and the lure of working online. A study of English composition students by Grimes and Boening (2001) found that all the students "preferred Internet sources to traditional print sources because of the ease in locating and printing out the results and because of the perceived abundance of information compared to books and periodicals" (18). A survey by Arnold and Jayne (1998) showed some disturbing results: while students recognized that books and periodicals were the most useful resources for their research, they still indicated that for future assignments they would search the Web first (46).

A good way to coax students away from Google and encourage them to use other tools is to tell them the price of proprietary databases. Students may be amazed to learn that a single database can cost tens of thousands of dollars each year. They also may not realize that libraries purposely buy Web-based versions of some of the most valuable and heavily used resources. Since the contents of these resources are invisible to Google, they must be found and searched individually.

As Grimes and Boening (2001) point out, students will most likely use quality resources if these materials are easily accessible. Students therefore need simple, clear instructions for finding appropriate resources. Most library Web sites provide good starting points for the library catalogue and for journal indexes and abstracts. Many also include Web pages with links to high-quality freely available resources for various disciplines. Another possibility is to select specific tools and resources and list them on a Web site for a class. Links should be as direct and clear as possible and include descriptive annotations, so students will easily find the resources and remember the rationale for using them. Otherwise, students may once again fall back on the results from their latest Google search.

Be sure that students also understand that many library services and proprietary resources are available from outside the library building. For example, registered users should be able to access most databases off campus, but they will need to authenticate themselves in some way. Also, nearly all libraries will answer reference questions by phone and e-mail, and some even provide interactive online

service for their users. In addition, most libraries allow users to request books and journals from other institutions using Web-based forms. Once again, if students are not aware of these services, or don't understand how to use them, they may flee back to Google.

Assignments that Work

The best time to teach students about the Web is in conjunction with a specific assignment, preferably one that provides a positive experience with appropriate research tools. Decide what the assignment should accomplish, what tools you want the students to use, and make sure these tools lead to appropriate materials. Be aware that database coverage can change: for example, databases often add or drop their access to particular journal titles, so a journal found in one place in the fall may have moved or disappeared by the spring.

Search techniques for databases are also fluid, since database providers frequently update the interfaces for their products. In addition, the prevalence of Web search engines is affecting the way students search any online resource. As Vine (2001) points out, users "treat all search boxes identically" (18). In our library, we now see students using Web search conventions, such as natural language queries and the + sign, when using proprietary databases. In most cases, the databases cannot interpret these conventions. Also, many students show a reluctance or inability to combine terms appropriately. An analysis of search queries on Questia, a commercial database marketed for students, showed that almost 50% consisted of only a single term (Hughes and Buchanan 2001, 370).

Such queries typically produce large numbers of results, many of which will be irrelevant to the information need.

Students seem unperturbed to receive thousands of hits from a search, probably because they rely on Web search engines to place the most "relevant" items first. They may not realize that most proprietary databases list their results by date rather than relevance; for these tools, a large results list should warn the user to improve the search statement. However, students typically do not question the results of their database searches. For example, a survey conducted at our library in 1996 found that 90% of the 88 students surveyed were satisfied with the results from their latest search. This included several students who had chosen databases inappropriate for their topic.

Once students understand the differences between free and proprietary resources, they are more open to learning new search strategies. Specifically, students need basic guidelines for combining search terms and for understanding how results are organized.

Consider collaborating with a librarian to create assignments that effectively incorporate Internet resources. For example, Ward and Reisinger (2000) provide a useful framework for faculty and librarians to design assignments together. Since librarians work directly with students and library materials, they gain a sense for assignments that integrate well with available resources. They are also familiar with students' searching skills and how these are changing over time. A librarian can also visit the classroom to introduce students to appropriate tools and search

techniques: librarians know the tools for specific disciplines and keep track of the changing coverage and search parameters for these tools. Many librarians are also skilled in conducting hands-on tutorials, which have proven effective for teaching the use of electronic resources. For example, Cudiner and Harmon (2001) have demonstrated that a combination of both lecture and hands-on instruction is more effective than a single teaching technique when introducing students to online information.

Evaluating and Citing Resources

One of the most important reasons for teaching students about the Web is to help them find and recognize quality resources. As Grimes and Boening (2001) discovered, while students are quite satisfied with their abilities to judge Web-based information, they only evaluate on a superficial level, if at all (20). Burton and Chadwick (2000) report that students place the highest value on Internet resources that are easy to find and easy to understand (319).

Evaluating Web resources is not in essence different from evaluating resources in other formats. However, the lack of quality control for freely available Web resources makes the need to evaluate all the more compelling. In addition, the structure and presentation of Web information–unclear boundaries between documents, fragmentation of large texts into small, screen-size pieces–challenges students to make sense of even familiar document types. Here again, students need to understand the characteristics of appropriate resources so they can recognize this information in either print or electronic form.

All materials, whether purchased or freely available, in print or online, need to be used with care. Basic criteria for judging authority, currency, accuracy and purpose can help students choose quality materials. Many libraries and campus writing centers prepare checklists of evaluation criteria. Also, many useful documents exist online, such as Kirk's "Evaluating information found on the Internet" (2002).

Throughout the research process, students need reminders of when and how to use appropriate resources. An effective way to focus their attention is to "integrate information-seeking and evaluative skills into the course content...." (Leckie 1996, 206). For example, students can be asked to submit sources, perhaps including evaluations, well before assignments are due. Instructors can then give feedback and guidance at an early stage, so students have time to adjust their strategies and increase their chances of success. As an additional benefit, this approach can help guide students away from intentional or unintentional plagiarism.

Students can also be encouraged to keep a log of the tools they use and the terms they search. This will help them plan their search strategy and also save them time if they need additional materials. The log will also help them cite their sources appropriately and accurately.

Students have considerable trouble citing sources, even when the sources are in print format. A study of student bibliographies by Hinchliffe and Kubiak (2002) found that 87% did not follow the required APA guidelines. In addition, not one student cited journal articles in electronic format, even though these students made

frequent use of full-text databases.

Again, students need basic guidelines: a few specific examples to follow. They need to understand the rationale for citing information: to acknowledge their sources and to leave a trail for others to follow. They also need to understand the importance of citing electronic resources appropriately. A number of Web sites provide examples for citing electronic resources in various styles (Citation and Style Guides).

Conclusion

Teaching students the use of Web-based materials, along with all the other important research skills, can be challenging and time consuming. However, much can be accomplished with a few clear guidelines and starting points, and by integrating relevant information into specific steps in the research process. Collaborations with librarians can also remove some of the burden from faculty and help emphasize the importance of the information-finding process to students. Once students have a rationale for learning good information-retrieval skills and some experience with quality resources, they will be more likely to use Web information appropriately and to succeed in their work.

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